

# Maths for Fun

If you think maths consists of incomprehensible equations and boring algebra, think again. Mike Bedford runs his slide rule over some inspiring software and websites and discovers that numbers can be fun

To many people the words 'fun' and 'maths' should never appear in the same sentence, let alone next to each other on the page. Maths rarely tops the list of a school's most popular subjects; in fact, the number of students taking the subject at A-level has dropped 25 per cent since 1991. So how can we suggest that this most loathed of subjects can actually be fun?

If you've already dabbled in fractals such as the Mandelbrot Set or tried your hand at that old chestnut the Game of Life (see 'The World's Strangest Computer Applications', *Shopper* July 2005), you'll appreciate that maths can be

fascinating and will be itching to try out some of the software packages and websites reviewed here. If you have yet to be convinced, why not give them a try? You won't find differential calculus, simultaneous equations or any of the other aspects of the subject that so filled you with dread in school maths lessons. Instead you'll find that maths can be visually attractive, absorbing and every bit as addictive as computer games. And who knows? Once you've got to grips with the lighter side of maths, you might just be willing to give algebra and number theory another chance.

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## REVIEW MATHS WEBSITE

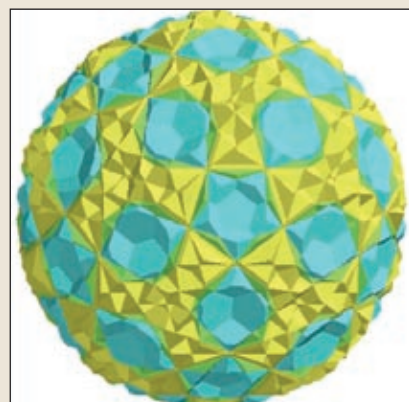
### Mark Newbold's Java Stuff

RATING ★★

WEB [dogfeathers.com/java/index.html](http://dogfeathers.com/java/index.html)

Four-dimensional figures are hard to visualise because we live in a three-dimensional world. However, just as three-dimensional figures can be shown as a series of two-dimensional slices (a cube can be sliced into squares, for example), a four-dimensional figure can be sliced into three-dimensional solids. PC screens are flat, which takes us one step further from four dimensions, but even so, the Java applets here make a stab at it.

If you're new to the bizarre world of four-dimensional geometry, this site won't go far to explaining what it's all about. However, the web is full of information on the fourth dimension, and this site has useful links to other sites. Once you understand the basics, or even if you just fancy playing around with attractive images, these Java applets are well worth a look.



Experience the fourth dimension or just throw some shapes at Mark Newbold's Java Stuff website

## REVIEW MATHS WEBSITE

### MathPuzzle

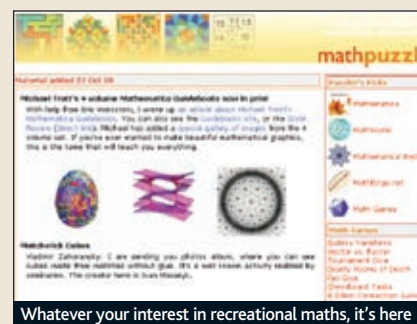
RATING ★★★★★

WEB [www.mathpuzzle.com](http://www.mathpuzzle.com)

MathPuzzle is an online magazine dedicated to recreational maths. Articles and contributions are put on the site regularly and archived every few months. The archives go back to 2000.

Topics are wide and varied, so this is an excellent place to start. A quick survey revealed articles on maths in the TV series *Numb3rs*, chess, prime numbers, Sudoku, music and fractals.

MathPuzzle also contains links to a huge number of mathematical puzzles – most of which are on the Mathematical Association of America site – and pages on a range of mathematical



Whatever your interest in recreational maths, it's here

topics of a light-hearted nature. You can read about a method Casanova devised to ensure gambling success and learn about probability in the process, or delve into the popular Polyominoes puzzles and discover the maths of tessellation.

## REVIEW MATHS SOFTWARE

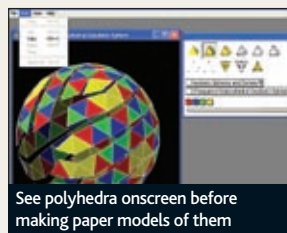
### PEDAGOGUERY SOFTWARE Poly

RATING ★★★★★

PRICE Shareware; \$28 registration fee

SUPPLIER [www.peda.com/poly/download.html](http://www.peda.com/poly/download.html)

DETAILS [www.peda.com/poly](http://www.peda.com/poly)



See polyhedra onscreen before making paper models of them

Polygons are multi-sided two-dimensional figures; polyhedra are the three-dimensional equivalents. There are just five convex regular polyhedra, but these are just the tip of the iceberg. Poly lets you explore 149 polyhedra in all their glory and displays them in various ways, including solid-shaded models that you can rotate onscreen.

Exploring three-dimensional figures on a flat screen is a compromise, so Poly lets you print

patterns that you can make into 3D models. If you can't work out how to fold your pattern, you can unfold the onscreen models gradually to find out what to do.

Poly supports only convex polyhedra, which is a shame as some of the non-convex ones, such as

the great stellated dodecahedron, are the most attractive. For an online presentation of polyhedra, including these omissions from Poly, see [www.georgehart.com/virtual-polyhedra/vp.html](http://www.georgehart.com/virtual-polyhedra/vp.html).

✓ Intuitive user interface

✗ Supports only convex polyhedra

REQUIREMENTS Windows 95/98/Me/NT4/2000/XP, 2MB disk space



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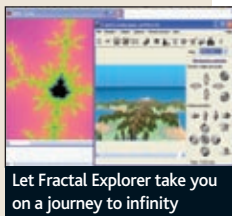
## ECLECTASY Fractal Explorer

RATING ★★★★★

PRICE Free

SUPPLIER [www.eclectasy.com/fractal-explorer/download.htm](http://www.eclectasy.com/fractal-explorer/download.htm)DETAILS [www.eclectasy.com/fractal-explorer](http://www.eclectasy.com/fractal-explorer)

Fractals are geometrical figures with an infinite amount of intricate detail. Fractal Explorer lets you investigate this detail by zooming into the heart of dozens of these patterns. Whereas some fractal programs let you zoom in forever, Fractal Explorer eventually reaches a limit and stops you seeing more detail. However, an add-on lets you view a fractal as a 3D landscape. Fractal Explorer is worth getting for this alone.



Let Fractal Explorer take you on a journey to infinity

✓ Landscape generation sets this apart from many fractal programs

✗ Limited zoom level restricts your fractal exploration

**REQUIREMENTS** Windows 95/98/Me/NT/2000/XP, 500MHz 486 processor, 64MB RAM (Windows 95/98/Me) or 128MB RAM (Windows 2000/XP), 3MB disk space

## REVIEW MATHS SOFTWARE

## M WOJTOWICZ Mirek's Celleration

RATING ★★★★★

PRICE Free

SUPPLIER [www.mirekw.com/ca/download.html](http://www.mirekw.com/ca/download.html)DETAILS [www.mirekw.com/ca](http://www.mirekw.com/ca)

The Game of Life involves placing organisms on a grid and investigating how they evolve from one generation to the next by following a simple set of rules. Mirek's Celleration (MCell) lets you delve into the world of Life with all its intricate patterns. However, the Game of Life is just one example of a cellular automaton (CA), and there is an infinite number of possible CAs, each with different rules. MCell supports 1D and 2D CAs and promises hours of fun.



Watch order evolve out of chaos with MCell

✓ The sky's the limit thanks to the vast number of options available

✗ The addition of 3D cellular automata would be a nice touch

**REQUIREMENTS** Windows 95/98/Me/2000/XP, 200MHz Pentium III processor (1GHz recommended), 128MB RAM (256MB recommended for XP), 16MB disk space

## REVIEW MATHS SOFTWARE

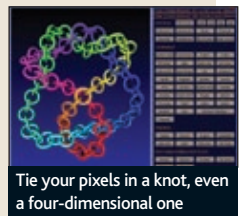
## R SCHAREIN KnotPlot

RATING ★★★★★

PRICE Free

SUPPLIER [www.pims.math.ca/knotplot/download](http://www.pims.math.ca/knotplot/download)DETAILS [www.knotplot.com](http://www.knotplot.com)

KnotPlot's main window displays knots as 3D figures that you can rotate and manipulate onscreen. It is awash with controls and options, and you can even view four-dimensional knots. This level of sophistication comes at a price, though. It'll take you some time to get to grips with the unintuitive interface, although it includes context-sensitive help and there's a wealth of material on the associated website.



Tie your pixels in a knot, even a four-dimensional one

✓ Capable of producing some very impressive graphics

✗ User interface is unfamiliar and unintuitive

**REQUIREMENTS** Windows 95/98/NT/Me/2000/XP, 450MHz Pentium II processor (2GHz recommended), 128MB RAM, 20MB disk space

## REVIEW MATHS SOFTWARE

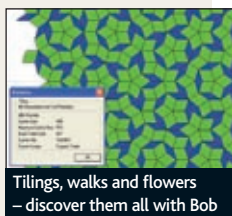
## S COLLINS Bob

RATING ★★★★★

PRICE Free

SUPPLIER [www.stephencollins.net/web/penrose/default.aspx](http://www.stephencollins.net/web/penrose/default.aspx)

Penrose tiling is a way of fitting figures together (or tessellating) to produce a pattern with five-fold symmetry. Bob lets you create Penrose tilings from two types of rhombus using a process called deflation, in which a single tile is replaced by a group of tiles. However, Bob's main purpose is to investigate 'walks' along the edges of these tiles. It might not have quite the same scope as other packages here, but it does let you delve into a largely unknown area.



Tilings, walks and flowers – discover them all with Bob

✓ Covers a topic you're unlikely to find elsewhere

✗ In scope, it's one of the most limited packages of those included here

**REQUIREMENTS** Windows 2000/XP (95/98 with some restrictions), Pentium processor (1GHz recommended), 64MB RAM (256MB recommended), 1MB disk space

## REVIEW MATHS SOFTWARE

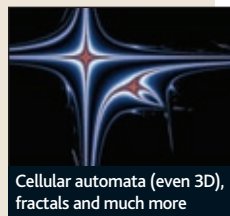
## SOFTOLOGY Visions of Chaos

RATING ★★★★★

PRICE Aus\$30 (around £13)

SUPPLIER [www.softology.com.au/voc.htm](http://www.softology.com.au/voc.htm)DETAILS [www.softology.com.au/voc.htm](http://www.softology.com.au/voc.htm)

This is one of the few packages here that you have to pay for, but its vast range of features makes up for that. The word 'chaos' in the name hints at fractals and chaos theory but, although these are included, Visions of Chaos does lots more. The number of fractal formulae is good, and you can zoom in as far as you want. Cellular automata supports 3D universes as well as the more common 1D and 2D. Beyond this there are strange attractors, demonstrations of flocking behaviour, simulations, genetic music and much more.



Cellular automata (even 3D), fractals and much more

✓ A fully featured package that covers lots of interesting areas

✗ Not free

**REQUIREMENTS** Windows 95/98/Me/2000/XP, Pentium processor, 256MB RAM (1GB recommended), 12MB disk space

## REVIEW MATHS SOFTWARE

## C GOTSMAN The Escher Software

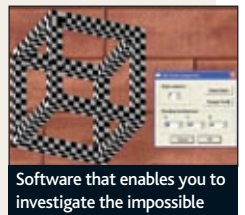
RATING ★★★★★

PRICE Free

SUPPLIER [www.cs.technion.ac.il/~gotsman/escher](http://www.cs.technion.ac.il/~gotsman/escher)DETAILS [www.cs.technion.ac.il/~gotsman/escher/html/software.html](http://www.cs.technion.ac.il/~gotsman/escher/html/software.html)

Art and maths come together in the work of the Dutch artist M C Escher, who is well known for his tessellations, symmetry and impossible figures. This package allows you to play with just one element of Escher-esque art: impossible 3D figures. To start with you load some of the included scenes and rotate them onscreen to discover Escher's secrets.

If you'd like to try your hand at defining transformation matrices, this is the software for you. **CS**



Software that enables you to investigate the impossible

✓ Fascinating for those who find Escher's art appealing

✗ Many more mathematical elements of Escher's work could have been included

**REQUIREMENTS** Not specified